have displayed so much ability. If we will acknowledge then that the rapid increase in the number and value of English physiological investigations is due to the existence of a suitable medium for their circulation—is a true *post hoc ergo propter hoc*, then we must also acknowledge that the future of the English school of physiology lies in the hands of the general medical public, through whose liberal support alone can this worthy enterprise prosper.

Not the least valuable feature of the journal is the publication in each number of a complete list of papers of physiological interest which have appeared in the intervals of publication of the different parts, a list already occupying forty-one pages. We think, however, that its value would have been greatly enhanced by the publication not of the titles alone, but of short abstracts of each paper, such as were formerly published in the *Journal of Anatomy and Physiology*. Very often the title is but an indefinite index of the contents of a paper, and after the greatest difficulty in obtaining access to original memoirs, it is only to find that they contain nothing in reference to the point which it was desired to study. We hope that the annual reprint of this bibliography that the editors have promised will contain short abstracts of the contents as well as the titles of the physiological memoirs. R. M. S.

ART. XLIV.—*The Cell Doctrine; its History and Present State; for the Use of Students in Medicine and Dentistry; also, A Copious Bibliography of the Subject.* By JAMES TYSON, M.D., Professor of General Pathology and Morbid Anatomy in the University of Pennsylvania, etc. etc. Second edition, revised, corrected, and enlarged. 12mo., pp. 202. Philadelphia: Lindsay & Blakiston, 1878.

THE modern histologist recognizes the "cell" as the ultimate physical element of organization, out of which all tissues, healthy or diseased, are formed. The modern physiologist localizes all of the so-called vital phenomena in the cell, and his science can, at present, do but little more than trace out the life-history of this elementary part. The discovery of these truths, like nearly all other discoveries, has a long history. In the volume before us Dr. Tyson has traced in chronological order the growth of this cell-doctrine from the crude *partes similares* of Aristotle and Galen, through its various evolutions down to the little clump of *bioplasm*, which modern science endows with the essential life-properties of reproduction, nutrition, and development.

The first edition of Dr. Tyson's work appeared in 1870, and at once received the favourable reception from the profession to which it was entitled by its merits. The present edition shows an increase in size of about fifty pages, and almost every page furnishes evidence of careful revision.

In comparing it with the former edition, we have to mention aside from many alterations in the arrangement of the subject-matter, and the presence of several new illustrations, the addition of two new sections. The first epitomizes the doctrines of Addison, Waller, Cohnheim (1842, 1846, 1867), while the second sets forth the latest views of the structure of cells and nuclei (1877–1878), thus rendering the history complete to the date of publication.

The closing section, giving an excellent summary of the present *status* of the cell-doctrine, into which the author has incorporated his own views, has been entirely rewritten, as was necessitated by the very numerous and important contributions to the subject mentioned above.

The bibliography, highly valuable to the student who wishes to prosecute his

tudies in this department of biology, occupies forty-four pages, and contains seven hundred and thirty-four references. The list now makes up nearly one-fourth of the book, and if it grows as rapidly in subsequent editions it will almost necessitate a change of title into "Bibliography of the Cell Doctrine, with an Historical Appendix." We would suggest the use of smaller type here. The addition of an index is a great convenience in referring to the contents.

Dr. Tyson divides the evolution of the cell doctrine into three periods; these include respectively the time prior to the discovery of the compound microscope, that between this event and the observations of Schleiden and Schwann, and in the third period are grouped the results of investigations up to July, 1878.

In few departments of medicine has original work been prosecuted with as much enthusiasm as in the field of histology. Consequently we expect to find what an examination shows to be true, that the discussion of the third period of our author's division shows the greatest change over the previous edition.

Here we find briefly but clearly given the results of the recent investigations of Frommann (1867–1875), Heitzmann (1873), Strassburger (1876), Flemming (1876), Klein (1878), and others, which demand a total change in the description of the structure of the elementary part of the more complex organisms.

"Henceforward we must describe not only the nucleus but also the cellular substance (protoplasm) as fibrillar in structure, made up of a network of delicate fibres, the meshes of which are filled with an 'interfibrillar' or 'ground substance' which is structureless, and that the fibrillæ of the *intracellular* and *intranuclear* networks are continuous. And if Klein be correct we must define the *nucleoli* as merely local thickenings, natural or artificial, of the *intranuclear* network." (Page 144.)

Owing to the importance of these late observations, Dr. Tyson has appended to the volume, with explanatory text, the essential portions of the plate illustrating Dr. Klein's paper, "Observations on the Structure of Cells and Nuclei," which appeared in the *Quarterly Journal of Microscopical Science*, for July, 1878.

Although our limited space will not admit of any lengthy quotations, we venture to extract the following opinion, coming as it does from so distinguished a microscopist as Dr. Tyson:—

"In *pathological formations* all the different forms of cells here alluded to are met with, and there is now no special type of cell which is known by its shape to have a pathological impression. It is rather by the rapidity of growth of cells, their arrangement and relation to the intercellular substance, as well as peculiarities in the latter substance itself, that we know a structure to be a pathological formation. 'The cancer-cell,' which was so long an object of wonder and fear, and eagerly sought for as such, is no longer acknowledged to be anything peculiar as to form. At the same time, when cells from a suspected growth are observed to be very large, to contain numerous nuclei or centres of bioplasm, and to exhibit great variety in shape, we have evidences of that rapidity of growth which is more or less characteristic of malignant formations." (Page 148.)

In conclusion, the thanks of the profession are due to Dr. Tyson for having rendered accessible information which, until his work appeared, was scattered throughout many volumes. Since a knowledge of the cell underlies any correct understanding of physiological or pathological processes the work under notice deserves a place in the list of authorized college text-books. W. J. C.